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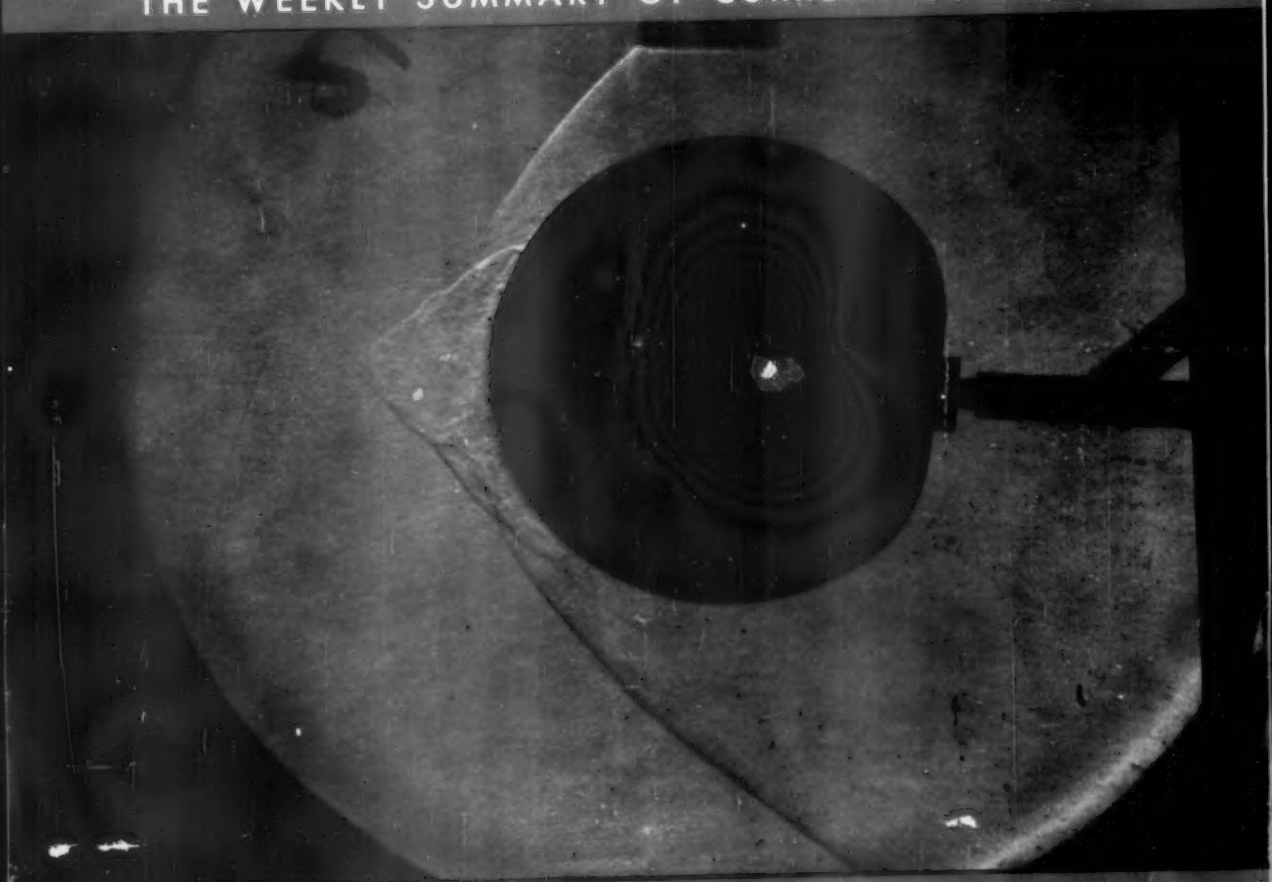
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September 28, 1957

VOL. 72, NO. 13 PAGES 193-208

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Dusty Shock Wave

See Page 199

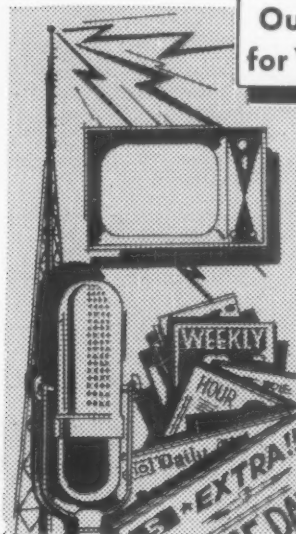
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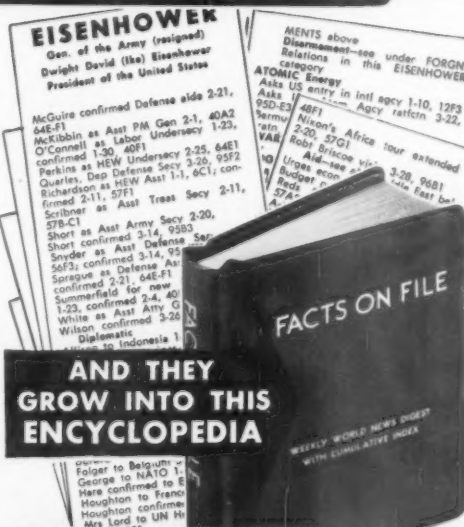
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AERONAUTICS

Radical Chemical Bomber

Top secret project aimed at fueling bomber with such chemicals as boron or lithium instead of petroleum products is on drawing boards of two aircraft companies.

► A TOP SECRET "chemical bomber" that will burn rocket-type high-energy fuels instead of gasoline is on the drawing board of two major aircraft manufacturers.

The revolutionary aircraft will fly higher, faster and farther than any manned bomber now believed in the planning stage.

It will not be a modification of any existing airplane, but will be an entirely new design to take advantage of "exotic" rocket and jet fuels now being developed.

Although the words "chemical bomber" recently have appeared without elaboration, no details of the multi-million-dollar, hush-hush project have been revealed. Aeronautical and chemical engineers attending the 37th national meeting of the American Institute of Chemical Engineers in Baltimore were able to describe some of the details to SCIENCE SERVICE, although they refused to be quoted by name.

The chemical bomber would use the newest and best possible fuels, such as boron, lithium, hydrogen peroxide and fluorine compounds, instead of petroleum products, engineers said.

Competitors for producing the plane are North American Aviation, Inc., and Boeing Airplane Company. The most widely known plane produced by North American was the World War II B-25. A contract for the chemical bomber would put North American into the "truly big airplane class," one engineer said.

On the other hand, Boeing has long been a leader in large military and civilian aircraft and wants to retain that leadership. Both companies recently have been notified of military plane cutbacks dictated by defense budget cuts.

Engineers said the competition between the two companies to produce the best chemical bomber design is "sharp and unrelenting."

Although the Air Force is not committed to order production on either design, one engineer said "the bomber is very much alive, it is now 'hot'."

The time for the Air Force to choose between competing designs for the "chemical bomber is probably very near," an informed source believes.

Only a spectacular and unexpected breakthrough in the guided missile program can block the building of the bomber, engineers agree. They believe a guided intercontinental ballistic missile with exceptional reliability and comparatively low cost could cause the Air Force to change its chemical bomber plans.

Although the Air Force has "no comment" and refuses to admit the existence of the hush-hush project, the existence of plans for "the world's most revolutionary airplane" was confirmed by the aircraft

manufacturers hoping to produce the bomber.

A spokesman for North American Aviation, Inc., said his company is working under an Air Force "design study contract" for a chemical bomber. A representative of Boeing Airplane Company said Boeing also is "very active in the design stage."

The chemical bomber is expected to carry a heavier pay-load than any plane or missile being planned.

The WS-110A is the second design requested by the Air Force, an aircraft industry official said. The WS-110 design originally requested proved too large and costly. It, too, was under study by both Boeing and North American.

Congressional budget cutting almost caused the Air Force to abandon its chemical bomber plans, industry personnel believe, but the value of such a plane outweighed budget consideration.

"WS" is the new Air Force designation

for "weapons system," since modern military aircraft have departed radically from older conceptions of "airplane."

The top-secret chemical bomber is not a final Air Force goal in long-range manned aircraft, but only an intermediate step to an atomic-powered plane, the industry believes. Besides being a major deterrent to global war, the chemical bomber is expected to provide performance data and production experience necessary to the design of a nuclear bomber.

The WS-110A probably will feature a major change in propulsion power. Rather than operate entirely on new chemical fuels, some of which have not yet been perfected, the WS-110A is expected to call on "exotic" fuels only in military situations. It may use advanced gasolines and other petroleum products for routine flying.

Science News Letter, September 28, 1957

TECHNOLOGY

Rare Gas Mixture Gives Better Fluorescent Lamp

► A FLUORESCENT LAMP that produces two and one-half times as much light as standard fluorescent lamps has been developed by Westinghouse scientists, Bloomfield, N. J.

The new lamp uses a mixture of rare gases to get long cathode life.

Science News Letter, September 28, 1957



BRAILLE MAP—Finishing touches are applied to Michigan State University's unique braille map by Max Hilton, one of a group of students who developed the map under the direction of Prof. Carl S. Gerlach. Installed in the University's library room for the blind, the map reproduces more than 100 buildings and a large part of the 50 miles of sidewalks and 20 miles of roadways on the campus, all raised in copper. Sightless students have tested the map's design—dotted lines indicate walks, solid lines, roadways—and approved it. Anaconda Copper Co. donated the necessary sheet of electro-deposited copper, 32 by 42 inches and 0.005 of an inch thick.

CHEMISTRY

One Smog Theory Upset

► "LAUGHING GAS" formed in the upper atmosphere was cleared of any responsibility for production of earth-bound smog at the American Chemical Society meeting in New York.

In reporting that upper atmosphere nitrogen compounds are not related to smog formation, as some theories have suggested, an Air Force scientist gave ammunition to a growing body of scientists who place the blame for the increasing smog and air pollution threat on automobiles. Other chemists promptly elaborated with detailed evidence against auto exhaust fumes.

Dr. Lewis E. Miller, Air Force Cambridge Research Center, Bedford, Mass., ruled out the possibility that nitrogen compounds always associated with smog might be formed at high altitudes by natural reactions. Although nitrous oxide, sometimes called "laughing gas," is found at very high altitudes, it is prevented by an atmospheric layer from reaching earth where it could engage in the formation of smog.

Sunlight, it is thought, acts on nitrous oxide to produce nitric oxide and nitrogen dioxide, major smog ingredients. When this upper atmosphere nitrous oxide passes through the lower ozone layer girdling the earth, the laughing gas is broken down into harmless components not associated with smog, Dr. Miller believes.

The Air Force scientist emphasized that, so far as his report is concerned, the work does not rule out the possibility that nitrogen oxides are formed lower in the atmosphere, below the ozone layer. He told SCIENCE SERVICE that, before the relationship between nitrogen oxides and smog formation can be thoroughly understood, "information of the chemistry of these oxides at all levels of the atmosphere is needed."

Most air pollution theories name automobiles as the major culprits and hold that smog-forming nitrogen oxides pour into the atmosphere from car exhausts. The evidence amassed against automobiles in recent years was strengthened by these reports before the ACS symposium on air pollution:

1. The amounts of nitrogen oxides released through exhausts depend on the immediate operating condition of the engine, G. J. Nebel and M. W. Jackson, General Motors Corporation research staff, Detroit, reported. The influencing factors are air-fuel ratio, spark timing, manifold pressure, engine speed and compression ratio, with greatest amounts of nitrogen oxides formed by "lean" fuel mixtures containing too much air. (See p. 200.)

2. The variables reported by the General Motors scientists were confirmed by D. A. Hirschler and R. C. Getoor, Ethyl Corporation Research Laboratories, Detroit, who verified their laboratory work by road tests with passenger cars.

3. Smog ingredient measurements made in Los Angeles by Air Pollution Foundation scientist Dr. Lewis H. Rogers showed a direct correlation between smog and the presence of automobiles. He said recent

measurements made near a heavily-traveled freeway showed higher concentrations of nitrogen oxides than reported by an earlier test made away from traffic.

4. Earlier reports indicating smog formation does not depend on the type of gasoline burned were denied by Dr. Paul P. Mader, Joseph Glikman, Marcel Eye and Dr. Leslie A. Chambers, also of the Air Pollution Foundation. Gasolines of a type produced before 1940 have less smog-producing ability than do the fuels marketed since 1942. However, they pointed out, new types of gasoline, finding increased use the past two years blended with other gasolines, contain fewer smog-producing ingredients.

Irritants in Smog

► SCIENTISTS will be able to dig deeper into the smog problem with a technique reported that will permit the identification and isolation of air pollution components in sizable quantities.

Urban atmospheres contain hundreds of different compounds. So far about 100 organic compounds have been extracted in pure form, of which only a few have been positively identified. The main technique used so far, chromatography, yields smog compounds only in minute quantities.

The larger quantities should permit identification of the separate components in air samples. Scientists might also be able to determine which compounds are capable of causing cancer and which, if any, of the cancer-producers are present in large enough amounts in the air to start cancers.

The new method is called fractional sublimation. Smog samples are placed in a tube, heated and vaporized. When they resolidify they do so in pure crystalline bands at different points along the tube. The tube is cut into sections, each containing different components.

The research of Jerome F. Thomas, Bernard D. Tebbens, Mitsugi Mukai and Eldon N. Sanborn of the University of California's School of Public Health was reported to the Chemical Society meeting.

Science News Letter, September 25, 1957

SURGERY

Foot Drop Cases Aided By Muscle Transplants

► CASES of foot drop, where the muscle that normally lifts the forward part of the foot is paralyzed, can be corrected surgically by transplanting half of a muscle that controls the flexing of the heel.

This was reported by Dr. Gene D. Caldwell of Louisiana State University to the International College of Surgeons meeting in Chicago.

Persons with foot drop have what is known as "steppage gait." Since there is no muscle to hold the foot up, it hangs limply when lifted and either causes an

awkward drag in walking or forces the person to step high.

The new operation requires splitting the gastrosoleus muscle, which serves the ankle, and transplanting half of it to provide the power needed to lift the foot. It has been done in 13 patients and when the correct half of the muscle was used, the operation gave satisfactory results.

All of the patients showed a markedly improved gait, Dr. Caldwell said.

Although the number of cases is small and the follow-up time probably too short to draw any positive conclusions, the new technique has proved the most satisfactory to date, he added.

Science News Letter, September 28, 1957

SCIENCE NEWS LETTER

VOL. 72 SEPTEMBER 28, 1957 NO. 13

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, 1719 N. St., N.W., Washington 6, D. C., NORTH 7-2255. Edited by WATSON DAVIS.

Subscription rates: 1 yr., \$5.50; 2 yrs., \$10.00; 3 yrs., \$14.50; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

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Printed in U. S. A. Entered as second class matter at the post office at Washington, D. C., under the act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for by Sec. 3440, P. L. and R., 1948 Edition, paragraph (d) (act of February 28, 1925; 39 U. S. Code 283) authorized February 28, 1950. Established in mimeograph form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Manager: Fred A. Moulton, 1719 N. St., N.W., Washington 6, D. C., ME. 8-2562.

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BIOLOGY

Produce Mutant Bacteria

► SCIENTISTS played a practical joke on nature and were rewarded in turn by a practical joke with rather gruesome implications.

A team of Columbia University scientists slipped a group of bacteria a counterfeit gene substance in lieu of their natural material. The bacteria responded by accepting the substitute chemical and then proceeded to produce a form of life that gave rise to generation after generation of monsters "physically and chemically unlike any known cells."

Some of the monsters even persist and give rise to new monsters long after the counterfeit gene substance has disappeared and been replaced by the natural material again.

These experiments, supported by the American Cancer Society, were reported to the American Institute of Biological Sciences meeting at Stanford University, Palo Alto, Calif., by Drs. Stephen Zamenhof, Rosalie De Giovanni and Sheldon Greer.

Organisms known as the sewage bacteria, described as living "harmoniously with man in his intestine," were fed the chemical 5-bromouracil. The chemical was selected to fool the bacteria into believing it was the amino acid thymine, a part of their natural diet.

The bacteria were fooled, and to such an

extent that they gave rise to a whole new world of "monsters"—some smaller than the parent, some almost 100 times larger than the parent and some that did not even look like the parent.

But the "taken in" bacteria did not stop there. They developed their own personalities—unstable mutant forms with a chemistry that could protect them from poisons having the power to kill their non-bogus parents.

These "monsters" in turn produced more monsters, some for as many as 180 consecutive generations.

Three or more of every 100 cells mutated. Normally, only one in one billion of these bacteria shows up as a mutation.

The scientists then realized they had created a race of monsters with the unique ability of remaining quiet for generations and then suddenly exploding with the force of cancer cells.

This might mean, Dr. Zamenhof said, that a normal cell injured many generations ago could conceivably be passed on from father to son all along the line and then one day go wild.

It might also mean that these so-called unstable mutants have the ability to acquire an armor that protects them against anti-cancer drugs.

Science News Letter, September 28, 1957

PSYCHOLOGY

"Brainwashing" Uses 3 D's

► COMMUNIST success in "brainwashing" of prisoners, extracting "confessions" from them and making them accept communist propaganda, need not be attributed to any mysterious powers or diabolic drugs, a team of two psychologists and one psychiatrist reported to the American Psychological Association meeting in New York.

The Communists base their success on clever use of DDD. The three D's stand for debility, dependency and dread. Through hunger and disease, the prisoner is made physically weak. He is dependent on the captor for food, sleep and life itself. He is in constant dread of torture or death.

Through various defenses, a prisoner may postpone the development of DDD for a long time, perhaps indefinitely, but if DDD is extreme and if the prisoner lives, he probably cannot resist indefinitely. His compliance is a natural consequence of ordinary principles of human behavior.

In a way, "brainwashing" through DDD depends upon the application of the psychologist's technique of conditioning. But this by no means indicates that Communist captors were amateur or professional psychologists. Animal trainers and sideshow barkers are often very competent in manipulating human behavior, but this does not mean that they are psychologists.

Success of DDD in breaking down the defenses of prisoners was due largely to the

fact that it was not constant, but intermittent, thus preventing the prisoners from being permanently depressed and hopeless.

The captors used relief of DDD as a reward to induce and reinforce desired behavior. Relief of hunger, fatigue, isolation or pain, even temporarily, serves to teach the prisoner to do what the captor wants him to do. Paradoxically, interrogation, harangues, threats and contumely may serve as rewards to the prisoner because in extreme suffering and isolation and weakness any contact with a fellow man is a relief.

There are many ways to build up before capture a soldier's resistance to the effects of DDD. Two mentioned by the scientists are to keep him in good physical health and vigor and to reduce his level of initial or chronic anxiety. The health of a prisoner can readily be broken by a captor. A soldier can also be trained to be generally non-anxious and so less susceptible to the third D, dread. But the fear component of DDD is not like neurotic anxiety or neurotic fears, and it may not be wise to extinguish such realistic fear in a prisoner. It may be what keeps him alive.

The scientists reporting the study were Drs. I. E. Farber of the State University of Iowa, Harry F. Harlow of the University of Wisconsin and Louis Jolyon West of the University of Oklahoma School of Medicine.

Science News Letter, September 28, 1957



LONG-DISTANCE UHF — Cornell Aeronautical Laboratory's 28-foot antenna and receiver are probing the problems of long-distance transmission of ultra-high-frequency signals over the horizon.

SURGERY

Brain Surgeons' Shampoo Rivals Permanent Wave

► A BRAIN surgeon described a hairsetting technique, that easily rivals any permanent wave, designed to save both the hair and the "face" of his female patients.

The medical hair-dressing has been tried on 20 patients to date without a single infection, Dr. Jonathan M. Williams of the George Washington University School of Medicine, Washington, D. C., told the International College of Surgeons meeting in Chicago.

He explained that women patients become distressed when they learn their hair must be cut for a brain operation and so he devised the technique to overcome the "psychological problem."

The first step in the technique is to have the patient shampoo her hair and scalp at least five times if possible, with a specially prepared surgical detergent. The patient is also told to use the same bobby pins, rubber bands and comb for the care of her hair during the shampooing.

"On the day of the operation," Dr. Williams said, "the patient is brought to the operating room, taking her own comb along. Another antiseptic solution, made in a watery mixture and colorless, is used."

"The surgeon uses the patient's comb to make a part in the hair exactly where he wants to make his incision. Sometimes this is curved—even horseshoe shaped."

Then the hair is firmly held in position by a wave setting compound applied from an aerosol bomb. After the incision is closed it is sewn together with contrasting colors of thread so the doctor can find it later. Dr. Williams noted that "patients say this is a wonderful shampoo."

Science News Letter, September 28, 1957

SCIENTIA INTERNATIONAL

NOVAS DEL MENSE IN INTERLINGUA

➤ **Agronomia.**—Le periculo de strontium-90, un del radioactive productos secundari de explosiones atomic, resulta del facto que iste elemento tende a reimplaciar calcium primo in le economia de plantas e subsequentemente de animales e humanos. Pro reducir le periculo, le agricultura de paises ingagiante in un guerra atomic deberea abandonar le cultura de plantas con radices superficial e con alte requirimentos de calcium. Patatas devenirent alora un privilegiato producto agricultural.

➤ **Agronomia.**—Un vacca del racia Holstein, elevate per le statunitense Departamento de Agricultura in un de su stationes experimental, ha establite le nove record de un production annual de 10,791 kg de lacte (con un contento de grassia de butyro de 4½ pro cento).

➤ **Antibioticos.**—Un del major fabricas pharmaceutical del Status Unite va lanciar al mercato un antibiotico destinate al uso in imbalsamar cadaveres human. Le objectivo es eliminar le periculo de contagiones accidental in autopsias.

➤ **Chirurgia.**—Al hospital ophthalmologic Henry Holland de Shikarpur in Pakistan Occidental, operationes pro glaucoma, cataractas, e altere disordines ocular es executate in massas sub le plus primitive conditiones: sin aqua corrente e sin le majoritate del facilitates que hospitales "civilisate" considera como indispensable. Nonobstante, le proportion de successos e malsuccessos a Shikarpur non es minus favorable que a New York, Paris, o Stockholm. Le experientias e le methodos del chirurgos de Shikarpur es obviemente de interesse particular pro chirurgos militar.

➤ **Chirurgia.**—Le chirurgo japonese Dr. Kazumi Taguchi, qui travalia currentemente al Universitate Minnesota, reporta successo in operationes cardiac effectuate sub le conditiones de un nove typo de hypothermia. Le temperatura del circulation general remane intacte (pro eliminar le periculo de fibrillation cardiac quando le corde es re-activate) e solmente le sanguine que circula in le cerebro es frigidate a 18°C per medio de un ducto extracorporee attachate al arteria carotica commun. Assi le requirimentos oxygenic del cerebro es reduce efficacissime. Operationes con arrestos cardiac de un duration de usque a 14 minutas ha essite effectuate per iste methodo sin ulte consequente insulto cerebral.

➤ **Illumination.**—Ingenieros del compania Westinghouse experimenta con le uso de un phosphoro que essera luminescente in le presentia de electricitate sed transparente e invisibile quando le corrente es interruptite. Per medio de iste invention, vitros de fenestra pote esser fabricate que functiona durante le nocte como lampas electric sed que presenta nulle obstaculo al lumine solar durante le die. On crede poter perfectionar le invention in le proxime futuro e lanciar le fenestra-lampa al mercato in 1960.

➤ **Electricitate.**—Dr. G. K. Lewis del Universitate Illinois ha constatate in un studio special que alcoholicos es plus sensibile al effectos de un choc electric que personas normal, que corrente alternante es plus periculose que corrente directe, que basse voltages seque le curso del minimo de resistencia durante que alte voltages seque le curso le plus directe, e que un corrente que passa per un organo vital—per exemplo le corde—es frequentemente plus a timer que un plus forte corrente que passa per un organo minus delicate.

➤ **Electricitate.**—Le ressources hydroelectric de Nove Zelanda es limitate, sed le pais possede extense reservoirs de energia in le forma de

geysers e subterranean vapor aqueo que pote esser utilisate in le alimentation de turbinas. Installationes pro iste objectivo es sub construction, e intra un anno Nove Zelanda va obtener 69,000 kilowatts ab su calderas natural.

➤ **Automobiles.**—Aluminium in omne colores del iride va esser usate in le ornamentos del automobiles de 1958. Le coloration del metallo es permanente. Illo es effectuate per un processo de anodisation que aperi le poros e permette le penetration del pigmento.

➤ **Medicina.**—Le causas de mongolismo e de leucemia es incognoscite. Pro ambe conditiones, il es ver, on ha stipulate (independentemente) le possibilitate hypothetic que illos resulta de prenatal stresses chimic, physic, o infectiose. Un recentemente reportate studio statistic revela que le occurrentia combinata de leucemia e de mongolismo in le mesme individuo es tres vices plus frequente que lo que essera explicabile como coincidentia accidental. Le supposition de un "denominator commun" in le etiologia del duo morbos pare multo plausibile.

➤ **Recercas Radiational.**—Post exponer amebas a duplemente letal doses de irradiation, investigadores al statunitense Laboratorio National Argonne ha succedite a salvar le vita de lor animalculos experimental in 91 pro cento del casos pro simplemente transfunder in illos protoplasma ab amebas non-irradiate. Le existentia de un specific factor de protection antiradiational in le protoplasma esseva demonstrate per experimentos de centrifugation: le factor migrava con le componentes le plus pesante. Illo ha non ancora essite isolate.

➤ **Ingenieria.**—Le ponte Jacques Cartier super le riviera Sancte Laurentio in Canada debe esser elevate per circa 20 m pro permettre le passage de naves transoceanic. Le labor consumera duo annos sed essera completate sin interruption del traffico transpental. Le arcs individual del ponte ha un longor de usque a 80 m. Illos es elevate hydraulicamente passo per passo in unitates de non plus que 10 cm. Post omne quatro elevationes, i.e. pro omne 40 cm de altor, le pilares es extendite per le addition de capites de cemento armate.

➤ **Hematologia Bovin.**—Laboratorios in varie paises, incluse plures functionante a stationes experimental del statunitense Departamento de Agricultura, collabora pro clarificar le relation inter le grupos de sanguine de vacas e varie factores genealogic. Le problema pare esser de interesse practic ab le puncto de vista del bovicultura scientific. On ha constatate que le grupos de sanguine in vacas es multo plus complexe que in humanos. Circa 50 factores antigenic es a considerar, de maniera que le typo de sanguine de un vacca individual es quasi invariabilemente unic.

➤ **Recercas de Cancere.**—Un studio statistic ha monstrate que cancere mammary es significativamente minus frequente in feminas qui ha portate e nutrit un o plure infantes que in feminas sterile. Infelicemente, le pluralitate de infantes non solmente reduce le probabilitate de cancere mammary; illo etiam augmenta le probabilitate de cancere del cervix uterin.

➤ **Phytopathologia.**—Post inocular fabas con virus de mosaico de tabaco, un gruppo de medicos del arma statunitense ha succedite a proteger le plantas contra le eruption del morbo mesme per immerger los in un extracto de ris. Usque nunc iste methodo de "vaccinar" plantas es un manovra puramente laboratorial.

Science News Letter, September 28, 1957

GENERAL SCIENCE

Reading Interlingua

➤ **YOU CAN READ** Interlingua if you had no more than one semester of high school French or Spanish or Latin and flunked it. You can read and understand a great deal of it even if you had never had contact with any foreign language.

Send this page to an acquaintance abroad and tell him that he can get additional information about Interlingua from Alexander Gode, Science Service's Interlingua Division, 80 E. 11th St., New York 3, N. Y.

Science News Letter, September 28, 1957

SURGERY

Mass Surgery Good Even In Primitive Setting

➤ **MASS SURGERY** done "in the rough" under primitive conditions in West Pakistan has proved to be as good as that done in any of today's fully equipped hospitals.

The mass surgery is being performed on diseased eyes at the Henry Holland Mission Eye Hospital in Shikarpur, West Pakistan, and the good results are of considerable interest in case of mass casualties from an atomic war. Dr. Roland I. Pritikin, Rockford Memorial Hospital, Rockford, Ill., reported to the International College of Surgeons meeting in Chicago.

The hospital has electricity but no other utilities. Water is pumped by hand, toilets are outside the buildings and in the operating room an aide holds an electric light over the patient.

The visiting Hindus cook their own food outside on the hospital grounds, using dried cow-dung charcoal for fuel.

The hospital is located in an area considered to be the world center of eye diseases because of nutritional deficiencies, and its surgical team operates for cataracts, glaucoma and other eye ailments. This year, it treated about 3,000 patients from Pakistan and Afghanistan.

The success of the hospital's surgery is especially important to military surgeons. In spite of the tremendous volume of patients handled under primitive conditions, the number of cases that are unsuccessful is no greater than those cared for under the most ideal conditions, Dr. Pritikin said.

Science News Letter, September 28, 1957

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OLD ATMOSPHERIC ENGINE—The Smithsonian Institution has been given one of the world's oldest atmospheric gas engines, built by its inventor, Nikolaus August Otto.

BIOCHEMISTRY

Malnourished Brain

► TESTS HAVE been developed that can be given children in order to indicate which may grow up to be alcoholics. Then, by feeding them the right foods, they can be kept from that fate.

This "bright picture" was revealed to the New York meeting of the American Chemical Society in the address of the president, Dr. Roger J. Williams, director of the Biochemical Institute of the University of Texas.

Appetites and abnormal cravings, like the craving for alcohol, have their seat in the hypothalamus of the brain, evidence indicates, and it seems likely that in alcoholics this portion of the brain has a deranged metabolism.

In alcoholics, Dr. Williams explained, the appetite-regulating center of the brain becomes malnourished.

That is because in potential alcoholics the nutritional needs of the brain center are unusual. Relatively high amounts of certain nutrients are needed, and it is not the same nutrients that are crucial in each case.

When anyone drinks alcohol in quantity, this tends to crowd out of the diet the wholesome foods that contain minerals, amino acids and vitamins. But when the potential alcoholic does this, it induces a circular effect which causes him to drink more and more alcohol.

That is because when he neglects to eat the specific foods demanded by his individual appetite center, the appetite center becomes deranged and he develops his abnormal craving.

Speaking of the alcoholism research in progress at the University of Texas, Dr. Williams said:

"We have demonstrated beyond question dozens of times that in experimental animals the desire to drink alcohol is in a striking way a function of their nutrition.

"Well-nourished animals drink little or none; poorly nourished animals always drink alcohol at a high level. Animals deliberately made deficient in a certain food element will drink heavily but will cease the drinking immediately when the missing food element is supplied."

He said it was his judgment, "based on experience and realistic appraisal, that most alcoholics who will cooperate can be greatly benefited now, and that the craving can be abolished more and more effectively in all, as the result of further research."

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PHYSICS

Dust on Model Creates Cone-Like Shock Wave

See Front Cover

► A SINGLE DUST PARTICLE on a model being tested in Cornell Aeronautical Laboratory's wind tunnel caused the unusual cone-shaped shock wave shown in the photograph on the cover of this week's SCIENCE NEWS LETTER.

The flow disturbance, invisible to the naked eye but visible by Schlieren photography, might cause serious problems for high-speed missiles encountering atmospheric dust when they reentered the earth's atmosphere.

Science News Letter, September 28, 1957

ENGINEERING

Old Internal Combustion Engine at Smithsonian

► ONE of the world's oldest internal combustion engines, built by its inventor, Nikolaus August Otto, has been donated to the Smithsonian Institution.

Officials of the United States and the Federal Republic of Germany participated in the ceremony. The engine, a gift of Kloeckner-Humboldt-Deutz A. G., Cologne, Germany, will be placed in the Smithsonian's new hall of power machinery.

The "atmospheric engine" is in working condition, developing one-half horsepower at 80 rpm. It is one of about 5,000 that Otto manufactured between 1866 and 1876, when he invented the four-stroke cycle engine that eventually became standard for automobiles.

Although the atmospheric engine did not use the compression principle, it was quite efficient by the existing standards.

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PHYSIOLOGY

Alcoholics More Easily Shocked Than Are Dries

► ALCOHOLICS can be shocked more easily than other persons. So can persons with hardening of the arteries, those with disturbed thyroids and those with greasy skin.

This is shown by a study on the effects of shocks by lightning and man-made electricity reported to the International College of Surgeons meeting in Chicago by Dr. G. Kenneth Lewis of the University of Illinois College of Medicine.

The effect of electrical shock on human beings is dependent on several factors. These include the type and amount of current, resistance set up in the body, path of the current, duration of the contact, conditions surrounding the accident and the question of individual susceptibility.

Aside from death, electrical shock can have damaging effects upon the heart and nervous system, stimulate strong muscular contraction, inhibit the function of vital organs, destroy cells and vital tissue and cause extensive latent dying off of burned tissues or cells.

The study showed that accidental contact "with anything above 110 to 115 volts of electricity is dangerous if the victim is wet and well-grounded," Dr. Lewis reported.

It also showed that alternating current is considerably more dangerous than direct current of like voltage and amperage.

Currents of low voltage follow a path of least resistance but currents of high tension tend to flow along the shortest path.

"Injuries produced by electrical accidents are more dependent upon the path of the current than its intensity, and current passing through the left side of a victim's chest or brain can be more dangerous than that traversing the right side because of its damaging effect upon the heart," Dr. Lewis pointed out.

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CHEMISTRY

**Thorium 'Breakthrough'
May Cheapen A-Power**

► A "BREAKTHROUGH" that promises to free the United States from its currently expensive atomic power dependence on uranium was reported to the American Chemical Society meeting in New York by Dr. Dennis D. Foley of the Battelle Memorial Institute, Columbus, Ohio.

The "breakthrough" is a process for the practical production of thorium fuel of reactor-grade purity and a way to get cheaper atomic power for peaceful purposes. Dr. Foley pointed out that presently, uranium-235 is the only naturally occurring fissionable material and "the indispensable element in atomic energy development." Thorium, however, is three times more abundant than uranium in the earth's crust.

For this reason, he said, the procurement of thorium pure enough for reactor applications has been one of the most serious problems in atomic energy programs.

Working under an Atomic Energy Commission program, the Battelle scientists perfected a solvent extraction process for treating thorium nitrate. It is said to be the only practical method developed to date for making thorium fuel of the required high purity.

A recovery of 99.89% of the thorium as a purified product was achieved.

The solvent extraction process was not the main objective of the AEC program. The Battelle scientists were trying to provide basic process design data for the AEC's Feed Materials Production Center at Fernald, Ohio. As a secondary objective, they hoped to produce enough high-purity thorium nitrate by solvent extraction to permit making an analysis of the impurities by actual slow neutron irradiation.

The somewhat "accidental" find means, Dr. Foley said, that "thorium may ultimately play an important role in the world's nuclear fuel supply." Robert B. Filbert Jr. of the Institute was co-author of the report.

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PSYCHIATRY

**Addict's Chances Slim
Since He Enjoys Illness**

► DRUG ADDICTS do not suffer from their illness, they enjoy it, and therefore their chances of ever breaking the habit are slim.

This is the belief of Dr. Sandor Rado, clinical professor of psychiatry, Columbia University College of Physicians and Surgeons, who has been studying the mental makeup of addicts for 30 years, as reported in the *American Journal of Psychiatry* (Aug.).

The pleasant effects of a narcotic drug strengthen a person's inner belief that he is all powerful, an idea that begins in infancy when a baby first realizes he can move. After that, the baby attributes unlimited power to his intentional actions and pictures himself as an omnipotent being.

This early belief is the hidden core of an

addict's desired self and under the effects of a narcotic, he regains the early feelings of power.

Narcotics bring a sudden change from pain to pleasure and this proves to the addict that, after all, he is the omnipotent giant he always fundamentally thought he was.

Strangely enough, even the addict's guilty conscience helps to tighten his grip on the drug. To placate his conscience, he turns to self-punishment and his unconscious mind drives him to further self-destruction with the drug. His conscious mind lets this happen because of the typical addict's belief that "Nothing can happen to me."

The mere withdrawal of the drug without other treatment is not enough to free the addict from his dependence on drugs. Available information shows that the majority of patients relapse within a few months and the rest within a few years.

Getting the addict off the drug has to be the first step in rehabilitation but the actual withdrawal is a precarious procedure. The idea solution in the future may come from the biochemists who discover a way to immunize a person against the pleasure-producing effects of a narcotic.

Steps in this direction have recently been taken with the discovery, in animals, of the brain's pleasure-producing centers.

Science News Letter, September 28, 1957

VETERINARY MEDICINE

**Special Odor Makes
Trailing Dogs Quit**

► POLICE DOGS and other canines trained to pursue a man by his scent can be made to flip over on their backs and lose interest in their work if the odor from certain fatty acids are placed in their paths.

This was discovered by a Japanese scientist who used the smell of butyric and other similar acids given off by decaying animal tissue to confuse trained police dogs completely.

The typical reaction to the odor was for the dog to follow carefully the trail up to where the acid odor had been placed. Then the dog would stop, roll over on its back, rub its shoulders on the spot and wholly abandon its pursuit work.

Dog owners or leaders have often noticed that their dogs, while taking a walk, turn upside down on the ground and rub their neck and shoulders against the ground for several minutes. Sometimes they repeat the ritual several times, and on close examination one can often find the decayed corpse of some animal such as a bird.

It was this observation that led Tohru Uchida, Hokkaido University, Japan, to test the effects of butyric and similar acids.

These acids are formed during the decay process and give off odors that smell more or less the same, but are all disagreeable to man.

The dogs, on the other hand, evidently find them more interesting than those of humans.

The research is reported in the *Proceedings of the Japan Academy* (Dec., 1956).

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IN SCIENCE

TECHNOLOGY

**Automobile "Halitosis"
In for a Cleaning**

► THE AUTOMOTIVE industry thinks it can cure its cars, trucks and buses of what one scientist termed "halitosis"—the unpleasant and unhealthy air pollutants spewed out daily by the nation's millions of vehicles. A special section of the Society of Automotive Engineers meeting in Seattle, Wash., heard the industry's reports on their latest research to clean up exhaust gases. (See p. 196.)

"Bad breath" in motor cars comes from unburned fuel and the smoky burning of engine lubricants. J. M. Campbell of the General Motors Corporation summarized what is being done about it:

A "vacuum limiting" device that cuts down smoky exhausts by holding back the formation of unburned fuel mixture in decelerations has been developed.

Flame-type "afterburners" for attachment on exhaust pipes and oxidizing catalysts for purifying unburned waste to produce an almost perfect exhaust of just water vapor and carbon dioxide are showing promise.

Instruments have been made to sample the components of exhaust gases and check their volume and after-flow. Some test cars carry \$50,000 worth of exhaust-measuring equipment.

Investigators are gathering data on driver habits in cities. In Los Angeles, for example, it has been found that a driver may spend more than twice as much time accelerating as he does idling or cruising.

Scientists have developed improved methods of detecting and removing poisonous carbon monoxide gases from inside of vehicles.

Science News Letter, September 28, 1957

SOCIOLOGY

**Parents' Divorce May Not
Be Cruel Blow to Child**

► DIVORCE of their parents is not always a tragedy for the children, Dr. Judson T. Landis of the University of California at Berkeley told the American Sociological Society meeting in Washington, D. C.

If the children have been kept in the dark concerning the conflict in the family and think their parents' life is serene, then the divorce comes as a painful blow and makes the children acutely unhappy and gives them a feeling of insecurity.

If, however, the children have been aware of the unrest and bitter conflict in the family, the children look forward to the divorce as a relief and a step toward a better life.

These differing attitudes were revealed to Dr. Landis in a survey of 330 children of divorced parents.

Science News Letter, September 28, 1957

IE FIELDS

MEDICINE

Child-Bearing Lessens Chances of Breast Cancer

► **WOMEN** who want to lower their chances of getting breast cancer should have children. The more children they have, the safer they will be.

This was indicated by a study of breast cancer cases at Ohio State University Health Center, Columbus, reported by Dr. M. T. Macklin to a joint meeting of the American Society of Human Genetics and the Genetics Society of America at Stanford University, Palo Alto, Calif.

Breast cancer is unduly frequent among single women and among married women who have not borne children. Studies have shown the mortality rate to be 60% higher for single women with breast cancer.

Breast cancer, like many other cancers, is caused by a combination of factors, some environmental and others inherited. A childless woman who is closely related to a woman with breast cancer runs a much greater risk than a woman who has no such close relatives.

But even though close relatives do have breast cancer, a woman may be able to suppress it in herself either completely or until much later in life by having children and nursing them.

"It is not yet clear whether it is the mere having the children which acts as a partial protection . . . or whether it is the amount of nursing that may accompany the child-bearing that is the important factor.

"Unfortunately, although the risk of developing breast cancer decreases with increasing number of offspring, the risk of developing cervical cancer increases," Dr. Macklin said.

The study has shown genetic factors are at least as important as environmental ones and maybe more so, she concluded.

Science News Letter, September 28, 1957

TECHNOLOGY

Natural Steam Rivals Atomic Energy for Power

► **UNDERGROUND** steam harnessed to produce electricity will rival atomic energy for power production in New Zealand.

This first large-scale use of an entirely new source of energy is scheduled for completion within a year. By that time, the New Zealand Government expects to feed 69,000 kilowatts of electricity into the country's power grid, Michael P. McIntyre of San Jose State College, San Jose, Calif., reports.

In *Science* (Sept. 6) he notes that only Yellowstone National Park, Iceland and Italy are known to have underground steam that can be tapped. The steam, and also geyser basins, boiling mud pools and hot

springs, are formed when ground water comes into extensive contact with hot subterranean rocks.

Test bores in the center of New Zealand's North Island have shown the natural steam occurs in an area covering more than 3,000 square miles. No "dry wells" have been found.

One relatively small and shallow bore, four inches in diameter at 575 feet, discharges 130,000 pounds of water and steam every hour. The roar of the jet can be heard four miles away.

The steam is free from impurities that could clog or corrode machinery.

The power station is being erected on the banks of the Waikato River near its source at the north end of Lake Taupo. Five 20-inch steam pipes will bring the steam about a mile to the plant.

Most of New Zealand's power is now hydroelectric and most of the practical dam sites have been developed. The country has no significant petroleum deposits and only modest coal reserves, both low in quality and costly to extract.

Since the population there is increasing at the phenomenal rate of two percent a year, Mr. McIntyre said, the demand for power continues to grow in spite of the fact that New Zealand often beats Norway in the largest per capita consumption of electricity.

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BIOLOGY

Large Fish Act Less Like Parents

► **THE BIGGER** you are the less you have to worry about taking care of your youngsters, that is, if you are a fish.

Large fish can afford to neglect this year's crop of children because they have plenty of time to produce more in later years. Not so the small fish, Dr. George C. Williams of Michigan State University told the American Institute of Biological Sciences meeting in Palo Alto, Calif.

The general impression, Dr. Williams suggested, is that fishes exhibiting exemplary parental traits produce fewer eggs than those that wander off and leave their young to fend for themselves.

This impression probably comes from the comparison made between small fish that exhibit good parental care and large fishes that do not.

"Large fish produce more eggs than small ones, regardless of the presence or absence of parental care," Dr. Williams said.

Generally, small fish expend more of their efforts in family matters than do large fish because their time in the water is limited. Their present breeding season is likely to be their last.

Not so the large fish, it will not only be around for a few more mating seasons, but will tend to grow more after reaching maturity than the small fish and the bigger it gets, the more eggs it can lay.

Thus, concludes Dr. Williams, "such a fish can afford to neglect this year's spawning because it represents but a small part of what it may produce in future years."

Science News Letter, September 28, 1957

CHEMISTRY

Leaded Gasolines May Threaten Some Workers

► **ANTI-KNOCK** gasoline additives containing lead may threaten the health of persons whose occupations keep them in heavy automobile traffic, although there is no health hazard to the majority of the population.

A study of lead particles formed from the combustion of gasoline containing tetraethyl lead was reported by a University of Chicago chemist to the American Chemical Society meeting in New York.

Persons who follow average occupations and spend only a normal amount of time in or near heavy traffic inhale only about one-third the maximum allowable concentration of lead particles, Miss Barbara J. Tufts, department of meteorology chemical analyst, reported.

With the small concentrations of lead particles in the atmosphere, no health hazard exists for most of the population, "except possibly to those whose occupations require a constant exposure to highway atmospheres," Miss Tufts said.

She added, however, that "serious consideration ought to be given the matter in view of the expected increase in automobile population in the future."

Air samples were drawn through fine membrane filters that captured all lead particles, then the filters were chemically analyzed for lead content. The greatest number of particles found were of a size that could most easily reach the lung, one to three microns. A micron is about four one-hundred-thousandths of an inch, 0.00003937 inch.

Samples were taken under various traffic conditions, including starting and stopping, rapid and slow speeds.

Miss Tufts undertook the study, she said, for two reasons: the role of the automobile in smog and air pollution problems has aroused interest leading to studies of the gaseous combustion products but not of possible lead particles products, and lead by itself is a toxic agent and its effects can be cumulative.

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DEMOGRAPHY

Idea of Limiting Family Taking Hold in India

► **THE IDEA** of planning and limiting family size is taking hold in India, both among the city dwellers and country people, Dr. William A. Morrison of United College, Winnipeg, Canada, told the American Sociological Society meeting in Washington.

Sample surveys in three Indian states and in New Delhi showed that a fairly large proportion of both rural and urban populations are favorably disposed toward family planning. Those in the higher social and cultural groups, those who already have large families, and the younger people are even willing to use contraceptives for planned parenthood, Dr. Morrison found.

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ASTRONOMY

See Fall Constellations

Some characteristic fall constellations are visible in the southern sky during October, which also brings an unusual solar eclipse visible only from Antarctica.

By JAMES STOKLEY

➤ **ALTHOUGH** the autumn skies do not have the brilliance of those of winter, there are some interesting and characteristic constellations which now shine in the south.

These appear on the accompanying maps, which depict the skies as they appear about ten o'clock, your own kind of standard time—add one hour for daylight saving time—at the first of October; nine o'clock at the middle of the month and eight o'clock at the end.

High in the southern sky are the four stars marking the great square in Pegasus, the winged horse. Actually, only three of these are in Pegasus; Alpheratz, the one in the upper left-hand corner, is in the neighboring group of Andromeda, the chained lady. Diagonally opposite is Markab, which is in the horse's neck, as the figure was drawn on the old star maps.

The row of stars extending downward and to the right from Markab form the head. The stars extending westward from the upper right-hand corner are his forefeet, for the animal is shown upside-down!

If you follow downward the line of the right side of the square, you will come to a bright star, low in the south, which is called Fomalhaut, and is part of Piscis Austrinus, the southern fish. This is about as high as it ever gets, in our northern latitudes.

That is why it is represented by the symbol for a second-magnitude star, even though it is of the first magnitude, according to the system whereby the astronomer reckons star brightnesses. Because it is so low, its light has to pass through a greater thickness of the earth's atmosphere than if it were higher in the sky.

The symbols on our maps show the stars as they appear and they are only shown with their full brightness when they are fairly high.

Constellations of the Zodiac

Just below the square we find Pisces, the fishes, which is one of a row of constellations extending diagonally across the southern sky, down to the southwestern horizon. The others are Aries, the ram; Aquarius, the water-carrier; Capricornus, the sea-goat, and Sagittarius, the archer.

These are constellations of the zodiac; another is Taurus, the bull, low in the northeast. Beyond Sagittarius, and visible earlier in the evening than the times for which the maps are drawn, is Scorpius, the scorpion, also a zodiacal constellation.

The zodiac is the path through which the sun, moon and planets seem to move, and

at present Venus is in Scorpius. It sets, at the beginning of October, about an hour and three-quarters after the sun, but by the end of the month it remains above the horizon for nearly two and a quarter hours after sunset.

Of magnitude minus 3.7, Venus is far brighter than any other star or planet, so there is no difficulty in finding it.

Another planet, Saturn, is in the same part of the sky. Although of the first magnitude, it is less than a sixtieth as bright as Venus. At the beginning of October, Venus is to the west of Saturn. Moving eastward, it passes Saturn on Oct. 20.

The other naked-eye planets (Mercury, Mars and Jupiter) are now all so nearly in the same direction as the sun that they are not visible.

Returning to the stars, we find that some of the brightest of those now visible appear to the right of Pegasus. High in the west is Cygnus, the swan, with first-magnitude Deneb. Just below this star is Vega, in Lyra, the lyre. To the left of Lyra is Aquila, the eagle, with the star called Altair.

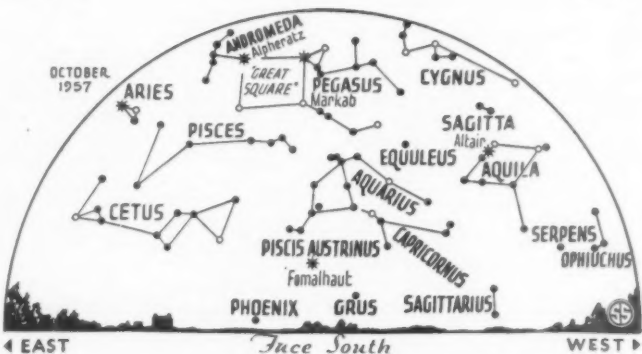
Now moving over to the east we find, near the horizon at the map-times, brilliant Capella, in Auriga, the charioteer. To the right is part of Taurus, the bull, with a reddish star called Aldebaran. Both of these belong to that brilliant array of stars which will be so prominent to the south during winter evenings.

On the celestial program for October there is an eclipse of the sun, but almost the only people to see it will be the members of the scientific parties located in Antarctica, making observations in connection with the current international Geophysical Year.

An eclipse of the sun occurs when the moon passes between sun and earth, so that the lunar shadow falls on our planet.

This shadow has two parts: the umbra, or inner shadow, where the moon completely hides the sun, and the outer penumbra, from which the lunar disc would only partially cover the sun's face. Where the umbra reaches, an eclipse is total; from the penumbra only a partial eclipse may be observed.

During the night of Oct. 22, by U. S. time, most of Antarctica, the southern tip of Africa, and the southernmost parts of Madagascar and New Zealand, as well as a large portion of the Indian Ocean, will be covered by the penumbra, so that a partial eclipse of the sun will be observed from these regions.



☉ * ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

The umbra, however, will just graze the earth's atmosphere, barely touching it along the Antarctic coast, near Halley Bay, where a British expedition is located. Scientists there will be able to take advantage of this opportunity for some unique observations, if the weather is clear; if it is not, the eclipse should still be useful.

One important phase of the IGY program is concerned with the ionosphere, the layer of the atmosphere that reflects radio waves back to the ground, and is affected by the sun's radiation. When the moon cuts this off, important observations are expected.

Without traveling to Antarctica, anyone who can see the evening skies in October will be able to see another eclipse—not once but several times. This will be of the star called Algol, in the constellation of Perseus, the champion, which is seen in the north-east, just above Auriga.

Algol, also known as beta Persei, is the second brightest star in this constellation; the brightest is Mirfak, a little to the left. Ordinarily, Algol is of magnitude 2.06, while Mirfak is 1.80, or about 25% brighter.

Below Algol (under the letter P in Perseus) is the star called epsilon Persei, of magnitude 2.88, and Algol is about twice as bright.

However, if you look at these stars at about 9:07 p.m. on the evening of Oct. 18, you will find that their order of brightness has changed, and epsilon is about 50% brighter than Algol, which is now only a third as bright as it is normally. On the evenings of Oct. 19 and 20, Algol will shine with its normal brightness, but on the 21st, 2.87 days after its previous diminution in brightness, it will again have faded.

Actually, Algol is not a single orb, but consists of two stars revolving around the center of gravity of the pair. There are many binary stars of which this is true, but with an eclipsing binary the plane of revolution is nearly in line with the earth, and one star is much fainter than the other.

Thus, every 2 days 20 hours 49 minutes, the dark component of Algol passes partially in front of the bright one and produces an eclipse, which dims its light. It takes about ten hours for the complete passage of the dark star.

Celestial Time Table for October

Oct. EST	
5 12:00 noon	Jupiter behind sun.
5:00 p.m.	Moon farthest, distance 252,200 miles.
8 4:42 p.m.	Full moon (Hunter's Moon).
13 3:30 a.m.	Algol at minimum.
16 12:19 a.m.	Algol at minimum.
8:44 a.m.	Moon in last quarter.
18 9:07 p.m.	Algol at minimum.
20 7:00 a.m.	Venus passes Saturn.
21 8:00 a.m.	Moon nearest, distance 224,400 miles.
5:56 p.m.	Algol at minimum.
22 11:43 p.m.	New moon; total eclipse of sun, visible from Antarctica.
25 10:47 p.m.	Moon passes Saturn.
26 10:17 a.m.	Moon passes Venus.
30 5:48 a.m.	Moon in first quarter.

Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, September 28, 1957

GEOPHYSICS

"Hams" Track Satellites

► RADIO "HAMS" and other volunteers have been asked to help track the earth satellites to be launched next spring as part of the International Geophysical Year, or IGY.

The U. S. National Committee for the IGY said the amateur radio tracking program will be known as "Moonbeam." The visual tracking program by volunteers is known as "Moonwatch."

Under the Moonbeam system, amateur radio groups will locate the satellites as they circle the earth some 200 to 1,500 miles from its surface and will receive scientific data transmitted from them. The Naval Research Laboratory heads the project, with assistance from the University of California's Jet Propulsion Laboratory.

The American Radio Relay League, to which most "hams" belong, supports the program. Moonbeam volunteers will use a simplified version of the primary Minitrack system. Both systems, developed at the Naval Research Laboratory, involve tuning in on the radio signals broadcast from the satellites at 108 megacycles for tracking and recording scientific data.

The simplified version is known as Minitrack Mark II. The Jet Propulsion Laboratory has developed a second system, Microlock, for receiving the radio signals.

Cost of both systems is expected to be within reach of interested amateurs.

Information turned in by Moonbeam volunteers will be of particular importance in

detecting small deviations in the satellite's orbit due to local irregularities in gravity and in recording scientific data that might be telemetered from the satellite at the time of a solar flare.

The main Minitrack stations, all of which are expected to be in operation by the end of September, will stretch along a line from Blossom Point, Md., to Santiago, Chile, except for one in Australia and one in California. Each is estimated to cost about \$120,000, not including personnel.

Moonbeam teams may also make important contributions to the IGY program by helping to locate the satellites initially; by providing additional data on the effects of the ionosphere, the electrically charged layers of the upper atmosphere, on radio signals; by providing time and position checks for the primary recording of data from certain satellite experiments; and by providing data if the satellite is seriously damaged, should this occur.

Requests for information concerning the Moonbeam program should be addressed to the Satellite Office, IGY Committee of the National Academy of Sciences, Washington, D. C.

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Lithium, a silvery-white metal which reacts with air, is about half as dense as water; its compounds are used in high-temperature greases, ceramics, metallurgy and atomic energy work.

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N. W., Washington 3, D. C. Request free publications direct from publisher, not from Science Service.

ALL ABOUT THE DESERT—Sam and Beryl Epstein—*Random House*, 148 p., illus., with drawings by Fritz Kredel, \$1.95. Deserts, the author tells his young readers, are alike in only one way—water is scarce.

ALL ABOUT ELECTRICITY—Ira M. Freeman—*Random House*, 141 p., illus., with drawings by Evelyn Urbanowich, \$1.95. A book for children on the fundamentals of electricity.

ALL ABOUT THE GREAT RIVERS OF THE WORLD—Anne Terry White—*Random House*, 150 p., illus., with drawings by Kurt Wiese, \$1.95. Telling young people "all about" five great streams—the Nile, the Amazon, the Yangtze, the Volga and the Mississippi.

BASIC MATHEMATICS FOR RADIO AND ELECTRONICS—F. M. Colebrook with additional chapters by J. W. Head and foreword by G. W. O. Howe—*Philosophical Library*, 359 p., diagrams, \$6.00. For those interested in electronic engineering who find themselves handicapped by their lack of mathematical knowledge. New edition of the book formerly published under the title "Basic Mathematics for Radio Students."

BASIC PHYSICS: Volumes 1 and 2—Alexander Efron—*Rider*, 692 p., illus., \$7.60. A high school text in elementary physics. The two volumes are bound together in a single book.

DIMENSIONS OF THE HUMAN FIGURE: Male and Female—Lloyd W. Sahley, George H. A. Clowes Jr. and William E. Neville, Eds.—*Cleveland Designers & Consultants*, 35 p., illus., paper, \$1.00. Information of value to anyone designing clothing, furniture or equipment for men or women to wear or use.

THE EDUCATION OF YOUNG CHILDREN—D. E. M. Gardner—*Philosophical Library*, 118

p., \$2.75. Addressed to teachers in nursery schools, this little book is also of interest to parents and others concerned with teaching little ones.

FROM STERILITY TO FERTILITY: A Guide to the Causes and Cure of Childlessness—Elliot E. Philipp—*Philosophical Library*, 120 p., illus., \$4.75. Every year doctors are learning how to change more and more infertile couples into fertile ones.

GEFFORD PINCHOT: The Man Who Saved the Forests—Dale White—*Messner*, 192 p., \$2.95. A biography for young people of a leader in conservation.

GLASS REINFORCED PLASTICS—Phillip Morgan, Ed.—*Philosophical Library*, 2d ed., 276 p., illus., \$15.00. Revised and partly rewritten. Discussing the chemistry of these plastics and many applications in industry.

A HISTORY OF INDUSTRIAL CHEMISTRY—F. Sherwood Taylor—*Abelard-Schuman*, 467 p., illus., \$7.50. Telling the history of the chemical theories from which sprang the 20th century chemical industries.

L. P. ALFORD AND THE EVOLUTION OF MODERN INDUSTRIAL MANAGEMENT—William J. Jaffe, introduction by David B. Porter—*New York University Press*, 366 p., illus., \$5.00. A study of the life work of an engineer with many talents.

THE LIFE AND WORK OF SIGMUND FREUD: Volume 3, The Last Phase, 1919-1939—Ernest Jones—*Basic Books*, 537 p., illus., \$7.50. In addition to a biography of the founder of psychoanalysis, this book contains analyses of Freud's impact on life and thought in our time and an evaluation of his importance for the future.

LUNA: The Story of a Moth—Robert M. McClung—*Morrow*, 48 p., illus., with drawings by the author, \$2.50. A book for children describing the life and surroundings of a moth.

ROADS, RAILS & WATERWAYS: The Army Engineers and Early Transportation—Forest G. Hill—*University of Oklahoma Press*, 248 p., illus., \$4.00. The Army Corps of Engineers, although founded for military defense, laid the important base for early transportation in this country.

A SHORT COURSE IN QUANTITATIVE ANALYSIS—Hobart H. Willard, N. Howell Furman and Egbert K. Bacon—*Van Nostrand*, 2d ed., 243 p., illus., \$4.25. Presenting the subject in an introductory form that may be covered in a one-semester course.

SOLID STATE PHYSICS: Advances in Research and Applications, Volume 4—Frederick Seitz and David Turnbull, Eds.—*Academic*, 540 p., illus., \$12.00. Research is progressing so rapidly in this field that it is planned to publish two new volumes each year.

TEN MILES HIGH, TWO MILES DEEP: The Adventures of the Piccards—Alan Honour—*Whittlesey House*, 206 p., illus., with photographs and with line drawings by Charles Geer, \$3.00. A book for young people telling the true life story of the twin brothers, Swiss scientists, who explored the depths of the sea and the upper reaches of the sky.

TETRAHEDRON: The International Journal of Organic Chemistry, Vol. 1, No. 1—Sir Robert Robinson and R. B. Woodward, Co-Chairmen—*Pergamon Press*, 158 p., illus., paper, when certified for personal use \$9.80 per year, libraries and institutions \$17.00. Contributions will be presented in one of three languages, English, French or German. Intended to cover all aspects of organic chemistry whether theoretical or applied.

A TEXTBOOK OF DAIRY CHEMISTRY—Edgar R. Ling—*Philosophical Library*, 3d ed., rev., illus., Volume One, Theoretical, 227 p., Volume Two, Practical, 140 p., \$12.00 per set. A text for students of agriculture and dairying based on a course of lectures delivered by the author at Midland Agriculture College, England.

Science News Letter, September 28, 1957

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GEOPHYSICS

Auroras in Arctic and Antarctic at Same Time

► AURORAS, the dancing color patterns that sometimes light up the night sky, occur in the Arctic and Antarctic simultaneously.

This discovery, one of the first to be made during the International Geophysical Year, or IGY, was reported by Prof. A. C. B. Lovell of the University of Manchester, England.

Scientists had suspected auroras in both hemispheres formed simultaneously, but did not previously have sufficient observations from the Southern Hemisphere to confirm the theory.

The simultaneous production of the shimmering rays of auroral light in the northern and southern skies shows the streams of charged particles follow the earth's magnetic field.

The IGY program, which made this discovery possible, compresses more than a score or more years of normal research into 18 months ending Dec. 31, 1958.

Science News Letter, September 28, 1957

PSYCHIATRY

Childbirth Insanity Same as Other Kinds

► INSANITY following childbirth is not, as has been thought, a special kind of mental illness caused by the birth of a child.

The so-called postpartum mental disorders are no different from other recognized ones, they just happen to have occurred after childbirth, a study by scientists at the New York Hospital, Westchester Division, has shown. The study by Dr. Mary A. White, Dr. Curtis T. Prout, Carl Fixsen and Marvin Foundeur is reported in the *Journal of the American Medical Association* (Sept. 14).

The authors also discounted the idea that the insanity occurs primarily after a mother's first pregnancy. They found that almost half of the 100 cases studied occurred after a second or later child.

Postpartum mental illness hits from one out of 300 to one out of 750 mothers. Although childbirth does not cause the insanity, it can be considered the "last straw" in an already poorly adjusted person.

Other situations that helped bring on the disorder included unstable marriages, immaturity of the mother, financial troubles, or the baby not being wanted by either the wife or her husband.

Earlier studies had indicated that Jewish mothers suffered from the mental illness more than those of other backgrounds, but this was not found to be true in the present study.

No specific treatment is yet known for postpartum mental disorders, just as none is known for other kinds of mental illness. However, three out of four mothers made a reasonably good recovery and three out of five made a complete one. The average time spent in a mental hospital was seven months.

Science News Letter, September 28, 1957

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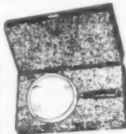
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MISCELLANEOUS

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Questions

AERONAUTICS—What are the fuels proposed for use in the "chemical bomber?" p. 195.

☐ ☐ ☐

GEOPHYSICS—What is the "Moonbeam" program? p. 203.

☐ ☐ ☐

MEDICINE—How does child-bearing affect the chances of breast cancer? p. 201.

☐ ☐ ☐

PSYCHOLOGY—What are the three D's used in "brainwashing?" p. 197.

☐ ☐ ☐

SURGERY—How can foot drop cases be aided? p. 196.

☐ ☐ ☐

Photographs: Cover and p. 197, Cornell Aeronautical Laboratory; p. 195, Michigan State University; p. 199, Kleckner-Humboldt-Deutz A. G.; p. 208, Rubbermaid Housewares.

MEDICINE

Pedigreed Mouse Output Reaches All-Time High

➤ THE MOUSE output of the world's most famous center for rearing pedigreed mice for medical research reached an all-time high this year.

More than 470,000 of the specially-bred disease fighters were sent throughout the world from the Jackson Memorial Laboratory, Bar Harbor, Me. An additional 730,000 mice stayed behind at the Laboratory where they were used in the continuing fight against cancer and other diseases.

The Laboratory, which sells the animals at cost and is the only one of its kind, finds, however, that the demand is still far exceeding the supply and has planned to step up the output with an additional 300,000 specially-bred mice per year.

Science News Letter, September 28, 1957

Do You Know?

In 1940, some 5,000,000 people were employed in clerical work in the U. S., and today the figure is between 8,000,000 and 10,000,000.

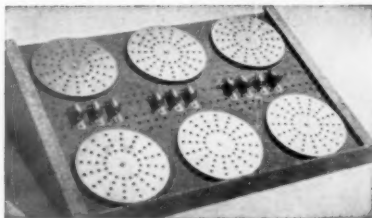
The hide of a mature walrus is used primarily in industry for buffing wheels to polish silver.

Planes will fly a total of something over 100,000 miles this summer in making inventories of waterfowl.

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❁ **LEAK PLUGGER** is both a wet surface roof coating and roof cement. It is described as permitting repair of ordinary asphalt roof coatings. Application in freezing weather, morning dew, or rain can be made with a brush or spray.

Science News Letter, September 28, 1957

❁ **ELECTRICAL ATTACHMENT** protects home appliances, power tools and other devices from overloading and defects. A built-in circuit breaker in the plug-in-protector is designed to fit on the end of an extension cord. Connected to the appliance, it provides individual overload protection.

Science News Letter, September 28, 1957

❁ **OVERHEATING GUARD** for the busy housewife is a heat alarm that fits into a pan with liquid foods. After being set to one of its ten heat settings, the alarm will sound off to remind the housewife that the food is ready. Based on a chrome-plated, stainless steel base, the alarm is said to be ideal for baby formulas, chocolate, soups, vegetables and water.

Science News Letter, September 28, 1957

❁ **MIXING BOWLS**, shown in the photograph, have been provided with a removable suction cup designed to hold them firmly to a table or a counter. Made in a set of three graduated sizes, the bowls are formed



from a non-porous lightweight plastic. They will not absorb grease or oil and can be safely washed in an automatic dishwasher. The suction cup clings to the bottom of the bowl and the top of a table.

Science News Letter, September 28, 1957

❁ **ROLLING RECORD CADDY** holds up to 250 long-playing record albums. Made of heavy-duty black wrought iron, the caddy measures 37 inches high, 15 inches wide and

22 inches deep. It is mounted on two-inch casters and provides a full-front view of every album cover.

Science News Letter, September 28, 1957

❁ **SHOTGUN CLEANER** and oiler consists of a polished wooden handle and wooden rod 34 inches long, completely covered with a pile of acrylic fiber. The fiber-covered rod will fit either 12, 16 or 20 gauge guns in all standard barrel lengths. An oiled "bob" of the fiber is made to be hooked to the end of the rod.

Science News Letter, September 28, 1957

❁ **PAINT EDGING TOOL** is said to produce sharp, clean edges around ceilings, windows, doors and baseboards. Made of plastic and colored red, the tool has two plastic wheels with serrated edges for guiding it. A white mohair pad had been attached to the aluminum frame and can take paint, varnish or enamel.

Science News Letter, September 28, 1957

❁ **GOLF BALL WASHER** is a helical agitator molded of a butyrate plastic. The ball is placed in the hole of the agitator and as the golfer moves the unit up and down the ball is rotated against a brush in a washing chamber. The washer is both rust and corrosion proof.

Science News Letter, September 28, 1957



Nature Ramblings



By HORACE LOFTIN

➤ **OLD TOM** made a prodigious leap from a nearby limb and landed on the platform holding the birdhouse. He peered through the opening at the helpless, naked young birds in the nest. If cats could smile, that is what Tom would be doing.

You know what happened. Tom ate well that morning. It seems to be a changeless law of nature that cats and birds are enemies, the hunter and the hunted. And it seems cats and rats, dogs and cats, lions and lambs all behave in this same way.

Changeless law? No, not really.

Probably all of us know of cases in which the family cat knows better than to attack the family canary, or the armistice between dog and cat under the strict surveillance of their master. But these are cases of enforced peace, so to speak. Now a Tulane University psychologist has found that "blood enemies" can be trained to live in harmony when they need each other for mutual aid.

Animals and the Golden Rule



For the experiment, the scientist used an alley cat with a "long and glorious record of rat-killing." The rat was laboratory-bred, young and tender. These two enemies were placed in a cage, but were separated by a glass, and later a wire, partition. A door connected their separate compartments with a common cage, and in this cage were two buttons which controlled electrically another door which led to a cage with food. To open this door, the cat had to press one button and the rat the other.

According to the scientist, about 700 trials

lasting nearly four months were necessary before the cat finally cooperated with the rat without any act of aggression. Once they had worked together to open the door to food, they ate amicably out of the same dish.

The experiment was then made more complicated, when an electric button controlling the rat's door was placed in the cat's cage. The only way the rat would be available to help the cat reach food now was for the cat to press the button, releasing his old enemy. He learned to do this in a hurry.

Thus, through conditioning, the rat-killing cat has been taught to cooperate with his traditional "enemy" toward a common goal.

This work seems to contradict the ancient idea that in animal nature there is an indestructible instinct of pugnacity which makes fighting or wars inevitable, the psychologist points out. Thus, the "golden rule" works, when used, to the benefit of both. The lion may lie down with the lamb.

Science News Letter, September 28, 1957